

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 18 December 2000 (18.12.00)	
International application No. PCT/SG99/00041	Applicant's or agent's file reference ST/63896
International filing date (day/month/year) 13 May 1999 (13.05.99)	Priority date (day/month/year)
Applicant OH, Hong, Lye et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
 14 November 2000 (14.11.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Pascal Piriou
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakhstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

PCT

REC'D 23 JUL 2001

WIPO

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT



(PCT Article 36 and Rule 70)

Applicant's or agent's file reference ...	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/SG99/00041	International filing date (day/month/year) 13/05/1999	Priority date (day/month/year) [13/05/1999]
International Patent Classification (IPC) or national classification and IPC H04N7/36		
Applicant STMICROELECTRONICS ASIA PACIFIC PTE. LTD. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 14/11/2000	Date of completion of this report 19.07.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Berst, C Telephone No. +49 89 2399 8028 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/SG99/00041

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-18 as originally filed

Claims, No.:

1-13 as originally filed

Drawings, sheets:

1/6-6/6 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/SG99/00041

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims 1-13
	No: Claims
Inventive step (IS)	Yes: Claims 1-13
	No: Claims
Industrial applicability (IA)	Yes: Claims 1-13
	No: Claims

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

V). Reasoned statement according to Article 35 (2) PCT:

The closest prior art is represented by the document D1:

ZIEGLER M: "HIERARCHICAL: MOTION ESTIMATION USING THE PHASE CORRELATION METHOD IN 140 MBIT/S HDTV-CODING" PROCEEDINGS OF THE INTERNATIONAL WORKSHOP ON HDTV, NL, AMSTERDAM, ELSEVIER, vol. WORKSHOP 3, page 131-137, XP000215234,

cited in the International Search Report, which discloses the principles of a hierarchical motion estimation in which individual motion vectors are calculated using a phase correlation method on the basis of larger windows of pixels (e.g. 64 x 64) comprising a given set of pixel blocks (e.g. 16 x 16). A selection of candidate motion vectors is performed on the basis of a calculated correlation surface (see figure 1) which are assigned to corresponding blocks using a block matching operation (see figure 2).

The document D2:

HANG H -M ET AL: "MOTION ESTIMATION FOR VIDEO CODING STANDARDS" JOURNAL OF VLSI SIGNAL PROCESSING, NL, KLUWER ACADEMIC PUBLISHERS, DORDRECHT, vol. 17, no. 2/03, 1997, page 113-136, XP000724575, ISSN: 0922-5773,

is a more general document which discloses in particular a motion estimation method according to the principles of D1.

The document D3: JP - A - 10 191 347 (japanese publication and corresponding patent abstract) discloses the analysis and detection of motion on a block-by-block basis as well as the calculation of a "rough motion" for a "semi-global block" obtained by collecting two blocks.

The other documents cited in the E.S.R. disclose background art on motion vector estimation in particular using search windows.

In the present demand, in order to save computing capacity, a group of related blocks is selected in a picture and, after having calculated the motion vectors for each data block in the selected group on the basis of a previous picture, a plurality of global motion vectors for the selected group are determined, each being formed of a plurality

of corresponding block motion vectors (corresponding to sub-groups of the selected group). The global motion vectors are analysed and a distribution pattern thereof is generated, on the basis of which a motion estimator scheme is selected from amongst a plurality of schemes (having e.g. different search windows). Finally, block matching and encoding can be performed according to the selected scheme.

Independent claims: claim 1 describes a motion estimation method, claim 8 a corresponding encoding method, claim 10 a corresponding block matching method and claim 11 a corresponding encoder.

For these reasons, the independent claims satisfy the requirements of the PCT with respect to Articles 33 (1 - 4) PCT.

Claims 2 - 7, 9, 12 & 13 are respectively dependent on these claims and, for this reason, also fulfil these requirements of the PCT.

VII). Certain defects:

- a) In order to meet the requirements of Rule 5.1(a)(ii) PCT, the documents D1, D2 & D3 should be identified in the description and the relevant background art disclosed therein should be briefly discussed.
- b) The independent claims are not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with **all** those features known in combination from the prior art (see document D1) being placed in a preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in a characterising part (Rule 6.3(b)(ii) PCT).
- c) Reference signs in parentheses should be inserted in **all** the claims to increase their intelligibility, Rule 6.2(b) PCT. This applies to both the preamble and characterising portion.

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference ST/63896	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/SG 99/ 00041	International filing date (day/month/year) 13/05/1999	(Earliest) Priority Date (day/month/year)
Applicant STMICROELECTRONICS ASIA PACIFIC PTE. LTD. et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☒ because this figure better characterizes the invention.

2

☐ None of the figures.

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04N7/36

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ZIEGLER M: "HIERARCHICAL MOTION ESTIMATION USING THE PHASE CORRELATION METHOD IN 140 MBIT/S HDTV-CODING" PROCEEDINGS OF THE INTERNATIONAL WORKSHOP ON HDTV, NL, AMSTERDAM, ELSEVIER, vol. WORKSHOP 3, page 131-137 XP000215234 paragraph '03.2!	1-13
A	HANG H -M ET AL: "MOTION ESTIMATION FOR VIDEO CODING STANDARDS" JOURNAL OF VLSI SIGNAL PROCESSING, NL, KLUWER ACADEMIC PUBLISHERS, DORDRECHT, vol. 17, no. 2/03, 1997, page 113-136 XP000724575 ISSN: 0922-5773 page 126, right-hand column, line 10 -page 127, left-hand column, line 7 — -/-	1-13

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

17 January 2000

Date of mailing of the international search report

24/01/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3018

Authorized officer

Berbain, F

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP 99/00041

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 10191347	A	21-07-1998	NONE	
EP 0831642	A	25-03-1998	JP 10098730 A	14-04-1998
WO 9530310	A	09-11-1995	US 5537155 A	16-07-1996
			AU 688893 B	19-03-1998
			AU 2273595 A	29-11-1995
			CN 1128097 A	31-07-1996
			EP 0711488 A	15-05-1996
			JP 8512189 T	17-12-1996
EP 0468279	A	29-01-1992	DE 4023449 C	23-01-1992
			AT 129112 T	15-10-1995
			DE 59106655 D	16-11-1995
WO 9843434	A	01-10-1998	DE 19712785 C	16-07-1998
			EP 0970586 A	12-01-2000

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 10 191347 A (CASIO COMPUT CO LTD) 21 July 1998 (1998-07-21) abstract	1-13
A	EP 0 831 642 A (NIPPON ELECTRIC CO) 25 March 1998 (1998-03-25) abstract page 4, line 7 - line 19	1-13
A	WO 95 30310 A (MOTOROLA INC) 9 November 1995 (1995-11-09) abstract page 8, line 4 - line 19	1-13
A	EP 0 468 279 A (ANT NACHRICHTENTECH) 29 January 1992 (1992-01-29) abstract figure 1	1-13
A	WO 98 43434 A (PANDEL JUERGEN ;SALAI ALBERT (DE); SIEMENS AG (DE)) 1 October 1998 (1998-10-01) abstract figure 4	1-13